International Journal of Civil Engineering and Technology (IJCIET)
Volume 8, Issue 3, March 2017, pp. 50–63 Article ID: IJCIET_08_03_005
Available online at http://www.iaeme.com/IJCIET/issues.asp?JType=IJCIET&VType=8&IType=3
ISSN Print: 0976-6308 and ISSN Online: 0976-6316

DESIGN AND ESTIMATION OF ECO FRIENDLY RIGID PAVEMENT WITH GEO PLASTIC BRICKS IN RURAL AREAS

Sankuru Naresh
Research Scholar, Department of Civil Engineering, K L University,
Vaddeswaram, Guntur, Andhra Pradesh, India

S.S. Asadi
Associate Professor, RPAC Chairman, Department of Civil Engineering, K L University,
Vaddeswaram, Guntur, Andhra Pradesh, India

A.V.S. Prasad
Professor, Department of Civil Engineering, K L University,
Vaddeswaram, Guntur, Andhra Pradesh, India

ABSTRACT

Since 2008-2012, world generated two sixty million tonnes of plastic waste and 2012-2015 it reached 298 million tonnes. Coming to the India sixty seven million tonnes of plastic waste generated per day, greater city like Hyderabad generated three thousand five hundred to four thousand tonnes per day and as per survey conducted by the municipal waste management India, average of 0.5 grams plastic waste generated by single person per day. Out of this only 25% to 30% of plastic wastes recycle effectively, remaining seventy five percentage of plastic waste leads to create land pollution because whatever the plastic waste generated it takes three fifty to four hundred years decompose in soil. Finally it leads to create environmental pollution and in the case of 25% to 30% effective recycle materials also expose some toxic element in to atmosphere so this kind of problems may resolve by Design and Estimation of Eco Friendly Rigid Pavement with Geo Plastic Bricks. In this the geo plastic bricks are arranged in first half of surface course from bottom with help of brick paver. The design eco friendly geo rigid pavement with geo plastic brick procedure like as our conventional design of rigid pavements as per IRC provision only. Here we are following IRC-58, IRC-SP 20-2002, and IRC-15-2002 code books for design of eco friendly rigid pavement. This is all most equal general design of rigid pavement but after getting the thickness of rigid pavement we are placing the geo plastic bricks in first half of surface course, if we provide like this the total construction cost of rigid pavement get reduces but this techniques only suitable for in rural areas because no that much of heavy load acting on the pavement so it is in safe condition but if it also used in urban areas but we need apply precautions against failures and by using of geo plastic bricks in the first half of surface course we require lot of bricks to construct base course and here if we use one geo plastic brick 28

grams of plastic waste reuse effectively without any harmful effects. Finally the total cost construction of rigid pavement get decreases and lot of plastic waste reuse effectively, we will see this in the end this paper work.

Key words: Design, Estimation of Rigid Pavements, Geo Plastic Bricks.

Cite this Article: Sankuru Naresh, S.S. Asadi and A.V.S. Prasad, Design and Estimation of Eco Friendly Rigid Pavement with Geo Plastic Bricks in Rural Areas. *International Journal of Civil Engineering and Technology*, 8(3), 2017, pp. 50–63.
http://www.iaeme.com/IJCIET/issues.asp?JType=IJCIET&VType=8&IType=3

1. INTRODUCTION

Day by day the usage of plastic waste increases rapidly for example In 2008, our global plastic consumption worldwide has been estimated at 260 million tons and according to 2012 report b global industry analysts, plastic consumption is to reach 297.5 million tons by 2015. Plastic is an adaptable, light weight, flexible, moisture resistance, strong and relatively inexpensive. A city like Hyderabad can generate nearly 3400-4000 tons of plastic every day. The average time for plastic to degrade is about 300-450 years. Due to lack of population control in India, the usage of plastic is too high and it is increased day by day. Due to plastic the soil losses its fertility and it effects to human beings, marine species and also blockage of drainage system etc. The amount of plastic waste generated every year in India has been increasing. The lack of natural recourses in India has also drivel the need to recycle materials for alternative uses. This paper work focuses on innovative way of recycling waste materials that is to use soil and plastic to make geo plastic bricks for construction of rigid pavement. As a highway engineering I would like to use these geo plastic bricks in placing half portion at top width of rigid pavements for prevention of land pollution due to plastic waste generation and create eco friendly environment and leads to reduce the cost of rigid pavement this is we look at the end of this paper work. These geo plastic bricks not only used in the rigid pavement these bricks also used in construction of walls in residential buildings so lot of plastic waste is recycle without harmful effects.

2. LITERATURE REVIEW

Different authors are said different manner about plastic waste utilization, recycle and reuse but there is a failure occur in their results such as different types of toxic elements are exposed in to atmosphere while reuse of plastic waste and this is only out of twenty five percentage of plastic waste recycling process and remaining plastic waste are not recycle properly so I would like to give the solution for different way those who ever never follow or create this type of technique, that is use of stabilized geo plastic in half thickness surface course of rigid pavement and the we are follow for the design of rigid pavements guidelines provided by IRC-58, SP 20-2002,15-2002 code book.

3. METHODOLOGY

The methodology include similar to design rigid pavement as per IRC guidelines after getting the thickness of rigid pavement, half thickness of the surface course with stabilized geo plastic bricks with help of brick paver. These stabilized geo plastic brick carries 28 grams of plastic waste. If we follow this kind of techniques for construction of rigid pavement in rural areas, the total cost construction of rigid pavement get reduce and it also leads to create the ecofriendly environment because the plastic waste reuse effectively. The detailed methodology for Design and Estimation of Eco Friendly Rigid Pavement with Geo Plastic Bricks given step by step as follows

- Data collection and Test results
- Detailed design as per data collection
- Estimation of rigid pavement with geo plastic brick

3.1. Data Collection and Test Results

3.1.1. Study Area

This area was situated out cuts of Nellore town. This the road I selected for design of rigid pavement because it has lot of importance and by wearing rigid pavement for this road, nearly 2 km distance are saved for lorry drivers and also reduce the traffic by provide lot of ways to one destination, if we observe the below 0figure-1 we can understand easily

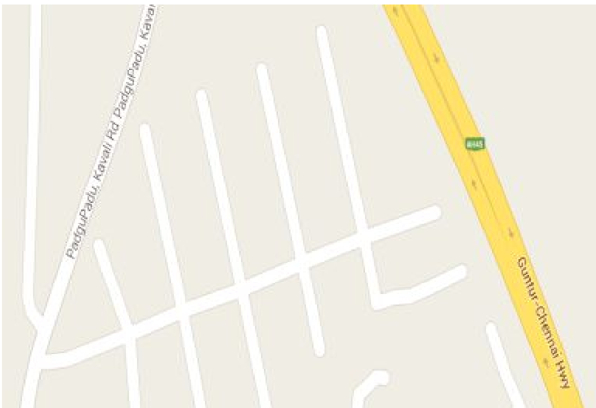

Figure 1 Map For Proposal Road

3.1.2. California Bearing Ratio (CBR)

Table 1 California Bearing Ratio Values

S.No	Penetration dial gauge	Readings mm division=0.01 mm	Proving ring reading	P5.01 division=5.01(load) kg.
1	0	0	-	-
2	50	0.5	0.8x5x5.01	20.04
3	100	1.0	0.8x5x5.01	20.04
4	150	1.5	1.2x25.05	30.06
5	200	2.0	2x25.05	50.10
6	250	2.5	3.8x25.05	95.19
7	300	3.0	4.2x25.05	105.21
8	350	3.5	4.8x25.05	120.24
9	400	4.0	6.9x25.05	172.84
10	450	4.5	7.2x25.05	180.36
11	500	5.0	8.6x25.05	215.43
12	550	5.5	10.2x25.05	255.51

Calculation

X_2=95.19, X_1=215.43

Percentage of un-soaked CBR for 2.5mm depth of penetration

$=\frac{95.19}{1370} \times 100$ =6.9%

Percentage of un-soaked CBR for 5mm depth of penetration

$=\frac{215.43}{2055}\times 100$ =10.48%

3.1.3. Slump Test

Slump value=2.5cm

3.1.4. Aggregate Impact Test

Aggregate impact value (AIV)=100w2

Aggregate impact value (AIV)=$\frac{100W2}{W1}$

W_2=70.4 grams

W_1=300 grams

Aggregate Impact value = (100×70.4)÷300=23.46%

The given aggregate sample is sufficient through and can be used in penetration

3.1.5. Compressive Strength of Concrete

Table 2 Compressive Strength of Concrete

Type of cement	3days	4days	28 days
OPC	35.55	38.33	40.11
OPC	37.13	39.49	41.12
OPC	38.73	37.77	40.11

Average compressive strength of concrete of 28 days=40N/mm^2

Note: Detailed Design Rigid Pavement And Estimation of Eco Friendly Rigid Pavement Discussed In Chapters-4 and Chapter-5.

4. DETAILED DESIGN

4.1. Design of Cement Concrete Road

Flexural stress=0.7$\sqrt{f_{ck}}$=0.7$\sqrt{40}$ =4.48N/mm^2

Strength of cc= (4.4810^2)÷9.81=45kg/cm^2

Young's modulus=5000$\sqrt{f_{ck}}$

E=3.510^5 kg/cm^2

Sub grade reaction modulus (K) =8kg/cm^2

Poison's ratio (μ) =0.15

Thermal expansion (α)=1010^{-6} /^{0}c

Tyre pressure (q) =8kg/cm^2

Rate of traffic increase=0.075

Spacing between joints=4m

Width of slab=12feet=3.6m

Table 3 Single axle load

Single axle load	
Axle load(tons)	% of axle loads
13-15 avg16 vehicles	0.05(lorry's, buses)
9-11 avg12	14.9(tractors)
<9tons	85.1(autos, bikes etc)

Table 4 Expected repetition

Load(tons)	%axle load	Expected Repetition
14	0.05	(0.05÷100)x790310.434=39.5
10	14.99	(14.99÷100)x790310.434=118.46
<10	85.1	(85÷100)x790310.434=671763.925

Trail thickness =8 inches

K=8kg/cm^2

Load safety factor=1.2

4.1.1. Check

Table 5 Fatigue Consumed

Axel load	Axel load*1.2	Stress Kg/cm^2	Stress ratio	Expected repetition	Fatigue life	Fatigue consumed
14	16.8	37.5	0.94	39.5	52	0.759
10	12	21.5	0.54	118.4× 10	5.2*10^6	0.022
<10	10.8	21.5	0.54	67.1*10^3	5.2*10^6	0.129

Fatigue Life N = 0.91

Hence design is safe

So 8 inch road is enough (h)=20.32 cm

4.1.2. Check for Temperature Stress

Cornerstress$=\frac{3p}{h2}\left[1-\left(\frac{a\sqrt{2}}{1}\right)^{1.2}\right]=\left(\frac{2.7\times10^5\times(20.32)^3}{12\times8(1-0.15^2)}\right)^{1/4}$

L=71.9cm

Consider single axel dual wheel spacing (s)=31cm

$$a=\left[0.8521\times\frac{p}{q\times\pi}+\frac{s}{\pi}\left(\frac{p}{0.5227\times q}\right)^{0.5}\right]^{0.5}=\left[0.852\times\frac{8000}{8\times\pi}+\frac{31}{\pi}\left[\frac{8000}{0.522}\times\frac{1}{8}\right]^{0.5}\right]^{0.5}=26.51\text{cm}$$

4.1.3. Corner Stress

$=\frac{3\times8000}{20.32^2}\left[1-\left(\frac{26.51\sqrt{2}}{7.69}\right)^{1.2}\right]=31.54\text{kg/cm}^2$

$=31.54<45\text{kg/cm}^2$

4.1.4. Hence Design is Safe

Designing many sections of pavement is default and design of rigid pavement is a big task and involves lot of engineering so to save the time we have prepared an excel sheet which can solve design problem within seconds.

Table 6 Cumulative Fatigue Life Consumed

% of axel loads	Vehicle type	Axel load (AL)	AL × 1.2	Stress, Kg/cm⁴ (From charts)	Stress Ratio	Expected Repetition n	Fatigue Life,N	Fatigue Life consumed
0.05	Single Axel	16	16.8	37.5	0.94	39.5×10^3	52	0.759
14.5		10	12	21.5	0.54	118.4×10^3	5.2×10^6	0.022
85.9		8	10.8	10.8	0.54	67.1×10^3	5.2×10^6	0.129
Cumulative fatigue life consumed								0.91

Table 7 Productivity Factors

DESCRIPTION	VALUE	UNITS
Flexural stress	44.8	N/mm^4
Strength of cement concrete	45.5498058	Kg/cm^3
Young's Modulus(E)	3.5×10^5	Kg/cm^3
Cumulative Traffic (C)	31612417.38	Cpvd
% of Axel Loads	0.05	
Expected Repetitions	39.5	
Fatigue Life Consumed(N)	52.0564	
Radius of Relative Stiffness(I)	71.9	Cm
Radius of area of contact of wheel (a)	26.51777615	Cm
Corner stress	31.54	Kg/cm^2

Table 8 Output Factors

Design Check	Condition	Result
1	N<1	Design Is Safe
2	Corner Stress < Flexural Stress	Design Is Safe
Final	Both 1 And 2 To Be Safe	Design Is Safe

5. ESTIMATION OF RIGID PAVEMENTS WITH GEO PLASTIC BRICKS

5.1. Leveling

In this method, the height of instrument (H.I) is calculated for each setting of the instrument by adding back sight to the elevation of the B.M (first point). The elevation of reduced level of turning point is then calculated by subtracting from H.I the fore sight. For the next setting of instrument, the H.I is obtained by adding the B.S taken on T.P 1 to its R.L. the process continues the R.L of last point is obtained by subtracting the staff reading from height of the last setting of the instrument. If there are some intermediate points, the R.L of those points is calculated by subtracting the intermediate sight from the height of the instrument for that setting

Figure 2 Auto Level

Height of instrument = Bench mark + staff reading = 100+0.25 = 100.25m
Elevation at 1 = H.I- Staff reading = 100.25 - 1.32 = 98.93 m
Elevation at 2=100.25 - 1.36 =99.89 m

5.2. Earth Work Estimation

By using mean sectional area method the earth works can be estimated as follows

$Q= (BD_{MEAN}+SD_{MEAN}^2) \times L$

Where

Length of chain age (L) =15m

Width of road (B) =4m

Upward gradient =1:150

Slope taken 1:2, therefore S=2

$D_{MEAN}=(d_1+d_2)\div 2$

Formation level is formed with help of upward gradient =100+ (CHAIN AGE÷150) =100+ (15÷150) =100.1m

d_1 =F.G.L-E.G.L at first point

d_2 =F.G.L-E.G.L at second point

Note:

- If we get the quantity in +ve value, it considers it as a filling and if it is –ve value, consider it as cutting.
- Here I take three points on width wise for calculating earth work very accurately.
- By using existing ground level obtain from leveling and mean sectional area method the cutting and filling values are calculated and represented as their corresponding chain age values. It is as shown in below tabular forms

Table 9 Earth Work Estimation of Chain age At Left side from 0 to 285m

S.No.	Chain Age	Cutting(M^3)	Filling(M^3)
1	0s	NILL	NILL
2	15	20.50	0.70
3	30	16.82	3.25
4	45	-	29.70
5	60	-	35.70
6	75	-	35.40
7	90	-	34.80
8	105	-	33.00
9	120	-	33.90
10	135	-	39.00
11	150	-	40.80
12	165	-	30.00
13	180	-	18.90
14	195	-	16.20
15	210	-	13.80
16	225	-	6.90
17	240	-	6.00
18	255	-	5.40
19	270	-	2.10
20	285	-	4.20
TOTAL		37.32	394.25

Table 10 Earth Work Estimation of Chain age At Intermediate Side from 0 to 285m

S.NO.	CHAIN AGE	CUTTING(M^3)	FILLING(M^3)
1	0	-	4.50
2	15	15.60	12.50
3	30	-	2.94
4	45	-	27.75
5	60	-	34.35
6	75	-	33.00
7	90	-	31.50
8	105	-	31.80
9	120	-	34.50
10	135	-	36.60
11	150	-	37.80
12	165	-	28.50
13	180	-	17.40
14	195	-	16.20
15	210	-	15.60
16	225	-	6.90
17	240	-	4.50
18	255	-	6.60
19	270	-	6.30
20	285	-	13.20
TOTAL		15.60	402.45

Note:

Like this we determine the earth work estimation for total length of road 1185m finally it is noted below

Table 11 Earth Work Estimation of Chain age At Right Side from 0 to 285m

S.NO.	CHAIN AGE	CUTTING(M^3)	FILLING(M^3)
1	0	-	4.50
2	15	-	10.38
3	30	-	21.78
4	45	-	30.48
5	60	-	37.17
6	75	-	37.32
7	90	-	35.41
8	105	-	35.70
9	120	-	53.70
10	135	-	54.33
11	150	-	38.34
12	165	-	29.16
13	180	-	18.18
14	195	-	17.25
15	210	-	17.82
16	225	-	14.70
17	240	-	9.60
18	255	-	7.20
19	270	-	9.60
20	285	-	17.10
TOTAL			482.47

5.3. Quantity of Sub-Grade Soil

5.3.1. Quantity of Cutting Soil

The total average quantity of earth cutting obtained =341.94 m^3

5.3.2. Quantity of filling Soil

Total average quantity of earth filling = 1156.68 m^3

The required quantity of earth =1156.68 – 341.94= 814.74 m3

Cost of filling of soil =814.74x130= 105916/- Rs

Table 12 Earth work

S.No	Iteam Name	Quantity (M^3)	Labour Requirement	Cost/Day/Person	Total Cost/Work
1	Excavation In Foundation,Trenches ,Etc	28.30	A)Beldars=5 B)Mazdoors=4	A)350x5 B)350x4	A)1750 B)1400
2	Refilling Excavated Earth In Foundations, Plinth, Etc	28.30	A)Beldars=3 B)Mazdoors=2 C)Bhishti=1/2	A)350x3 B)350x2 C)320x1/2	A)1050 B)700 C)160
3	Disposal Of Surplus Earth	28.30	Mazdoor=1	A)350	A)350

5.3.3 Cost of Cutting Soil

Total quantity of soil =341.94/28.3

Number of days =12

Table 13 Requirements of Labour

S.No	Description Of Item	No.	Cost/Day	Cost
1	5 Beldars	12x5	350	21,000
2	4 Mazdoors	12x4	350	16,800

Total cost of cutting for labour =37800/- Rs

5.3.4. Cost of Filling

Total quantity of filling =1156.68m^3

Number of days =1156.68/28.3 =40

Table 14 Labour requirements

S.No	Description Of Item	No.	Cost/Day	Cost
1	3beldars	40x3	350	43,050
2	2mazdoors	40x2	350	28,609
3	½ Bhisti	40x1/2	320	6,720

Total cost of filling for Labour =136470/- Rs

TOTAL COST FOR SUBGRADE =105916+37800+136470=280186/-

5.4. Quantity of Sub-Base Course

Length of the road (L) = 1182 mts

Width of the road (B) = 4.0 mts

As per design thickness of the road (T) = 0.36 mts

Volume of sub base course (V) = 1182×4×0.36 = 1702.08m3

As per IS-1911 unit weight of aggregate is= 1750 kg/ m3

Quantity of aggregate require for (Q) = Volume × unit weight of aggregate = 1702.0817×1750= 2978640 kg

5.4.1. Cost of Sub-Base Course

5.4.1.1. Cost of Course Aggregate

One Kg cost of coarse aggregate =0.88paisa/100= 0.0088Rs

Cost of coarse aggregate =2978640×0.0088=26212.032/- Rs

5.4.1.2. Labour Cost for Sub-Base Course

Table 15 Labour Cost Estimation

S.No.	Description Of Item	No.	Cost/Day	Cost
1	2beldars	60x2	350	42,000
2	2mazdoors	60x2	350	42,000
3	¾ Bhisti	60x3/4	350	14,400
4	¼ Mason	60x1/4	350	4,800

Total cost of labours =42000+42000+14400+4800 = 103200/- Rs
TOTAL COST FOR SUB BASE =26212.032+103200=129412.036/- Rs

5.5. Quantity of Surface Course

Length of the road (L) = 1182mts.
Width of the road (B) = 4.0mts.
As per design thickness of surface course (T) = 0.21mts
Volume of surface course contain concrete (V) = 1182x4x0.11 = 520.08m^3

5.5.1. Quantity of Concrete

Quantity (Q) = (volume) × (unit weight of concrete)
Proportion of M40 grade concrete=1:1.52:2.54 (cement: fine aggregate: coarse aggregate)

5.5.1.1. Quantity of Cement

As per IS-1911 Unit weight of cement=1440Kg/m^2
Quantity (Q) =Volume ×Unit weight of cement =520.08×1×1440 =748915.52Kgs=14978.304bags

5.5.1.2. Quantity of Fine Aggregate

As per IS-1911 Unit weight of fine aggregate=1780Kg/ m3 (for dry sand)
Quantity (Q) =volume × unit weight of fine aggregate=520.08×1.52×1780= 1407128.45Kgs

5.5.1.3. Quantity of Course Aggregate

As per IS-1911 Unit weight of coarse aggregate=1750Kg/ m3
Quantity (Q) =volume × coarse aggregate =520.08×2.54×1750 = 2311755.6Kgs

5.5.2. Quantity of Bricks

Quantity (Q) = Total volume ÷ one brick volume =425.52 ÷ 0.002=212760 no's

5.5.3. Cost of Surface Course

5.5.3.1. Cost of Cement

Number of cement bags require =14978.304bags
One bag of cement cost =310 Rs
Cement cost = 14978.304×310=4643274.24/- Rs

5.5.3.2. Cost of Fine Aggregate

One Kg cost of fine aggregate =0.64paise/100 = 0.0064/- Rs
Cost of fine aggregate = 2311755.6×0.0064=14795.2358/-Rs

5.5.3.3. Cost of Course Aggregate

One Kg cost of course aggregate = 0.88 paisa/100 = 0.0088/- Rs
Cost of course aggregate = 2311755.6×0.0088=20343.4493/- Rs

5.5.3.4. Cost of Brick

Cost of One brick =5/- Rs

Cost of total bricks =212760×5=1063800 Rs

Therefore total cost of surface course = 4643274.24+14795.2358+20343.4493+1063800
= 5742212.91 Rs

Table 16 Labour Requirement

Description of Item	No.	Cost/Day	Cost
2 beldars	18.35x2	350	12846/-
2 mazdoors	18.35x2	350	12846/-
¾ Bhisti	18.35x3/4	350	4819.5/-
¼ Mason	18.35x1/4	350	1605.6/-

Total cost of labours=32117.7/- Rs

Cost of brick paver for 2 days=100000/- Rs

Total Cost for Surface Course=5742212.91+32117.7+100000 =5874330.4/- Rs

5.6. Equipment Cost

Nearly the total cost require for equipment = 48000/-Rs

5.7. Total Cost of Project

Cost of sub-grade course including labour work =280186/-

Cost of the sub-base course including labour work =129412.036/- Rs

Cost of the surface course including labour work =5874330.4/- Rs

Cost of equipment =48000/-Rs

Contractor profit 10% of total cost of project =633192.864/- Rs

Miscellaneous works 4% of total cost project =253277/- Rs

TOTAL COST INCLUDING ALL = 7218398.65/- Rs**.**

6. SUMMARY

As per analysts the current Indian population is estimated to be 1.28 billion. The amount of plastic used by a person on average of 0.5 grams for a day, it depends up on area. With the increase of population, the amount of plastic is increased automatically. And it leads to create land pollution. To overcome this, the stabilized geo plastic bricks are prepared for construction of surface course of rigid pavement and also used as building materials, so that we can control the land pollution.

- In one clay brick, plastic is placed at the Centre of the brick to decrease the amount of plastic production. Plastic role is placed at the centre of the clay brick which form as a small void and results to a loss of strength. So I use some important stabilization techniques to increase its properties like strength, hardness, density etc.
- I prepare different types of stabilized geo plastic bricks; out of that calcium chloride stabilized geo plastic bricks get good results when compare with properties of conventional clay bricks. From getting this kind of results it can be recommended for construction material, especially these can be used in rigid pavement construction.

6.1. Geometrical Increase Method

$$P_n = P\left[1 + \frac{I_g}{100}\right]^n$$

$I_{g=}$Average percent increase per decade

P= Population on last year

n= Number of decades

P_n= Population on present year

7. CONCLUSION

$P_{n=1286344631}\left[1+\frac{2.25}{100}\right]^2$

$P_{n=}$**134488132.9**

The amount of plastic waste generated per day =134488132.9×0.5=67244066.4 grams

= 67244.0664 kg=67.244 tonnes

As per the results the amount of plastic on each brick is about

Samples	Weight of Plastic
Brick 1	26 grams
Brick 2	28 grams
Brick 3	29 grams

So by averaging the amount of plastic used, the general weight of plastic on each brick is a about

Amount of plastic=$\frac{26+28+29}{3}$ =27.66 ≅ 28gram

In this proposed project, I used to estimate rigid pavement with geo plastic bricks, after getting thickness from detailed design of rigid pavement, the thickness of surface course is 0.21 m.

In this process of estimation of rigid pavement with geo plastic brick, nearly 212760 geo plastic bricks are require to construct sub base course as composite one.

To follow this methodology to construct rigid pavement, the production of plastic should be reduces completely at certain period of time without any harmful effects.

Example, in this project work we require 212760 geo plastic bricks to construct that rigid pavement and each geo plastic bricks can recycle 28 grams of plastic waste = 212760×28 = 5957280 grams = 5957.28kgs = 5.97tonnes

And by follow this methodology to construct rigid pavement the cost also reduces.

- Cost of construction of conventional rigid pavement= 97,06,994/- (with contractor profit)
- Cost of construction of rigid pavement with geo plastic bricks=7218398.65 /-Rs.

If we follow this kind of construction technique for constructing rigid pavements in rural areas, we will reduce the total cost of construction 2488596/-Rs and also we will reuse the 5.97 tonnes of plastic waste for construction of rigid pavement. Finally it will create ecofriendly environment

REFERENCES

[1] Structural Design and Sensitivity Analysis of Semi-Rigid Pavement of a Motorway Jozef Judycki and Piotr Jaskula (Department of Highway Engineering, Gdansk University of Technology, Narutowicza Street 11, 80-233 Gdansk, Poland).

[2] AASHTO Rigid Pavement Design Dr. Christos Drakos University of Florida

[3] Creation of Eco Friendly Environment By Manufacturing and Testing of Geo Plastic Bricks and Usage of Stabilization Techniques in the Preparation of and Geo Plastic Bricks. Sankuru Naresh1, D.V.N.V. Laxmi Alekhya2, Hannah Vijayamohan3, GEC ,AP,INDIA

[4] Rate analysis schedule 2013-14.

[5] Estimating and coasting by B.N. Dutta.

[6] IRC-58, SP 20-2002,15-2002 code book.

[7] M. Harshavarthanabalaji, M.R. Amarnaath, R.A. Kavin and S. Jaya Pradeep, Design of Eco Friendly Pervious Concrete. International Journal of Civil Engineering and Technology, 6 (2), 2015, pp. 22-29

[8] M. T. S. Lakshmayya and G. Aditya, Design of Rigid Pavement and its Cost- Benefit Analysis By Usage of Vitrified Polish Waste and Recron Polyester Fibre. *International Journal of Civil Engineering and Technology,* 8(1), 2017, pp. 409–417.